

TEMPERATURE OF THE AIR.

The isothermal lines of chart No. II illustrate the general distribution of the temperature of the air for the month. By reference to the table on the left side of the chart it will be seen that the temperature of the month has been considerably above the mean in New England, and below the mean from the South Atlantic States to the Lower Lakes and westward. The greatest deviation occurs in Colorado and Wyoming, where the temperature is about seven degrees below the mean.

Minimum and Maximum Temperatures, respectively:—*Maine*—Mechanics' Falls, -4° and 46° ; Gardiner, 5° , 53° ; Eastport, 8° , 52° . *New Hampshire*—Mt. Washington, -15° , 34° ; Auburn, -2° , 54° ; *Vermont*—Newport, -14° , 49° ; Burlington, 6° , 56° . *Massachusetts*—Billerica, -1° , 40° ; Springfield, 8° , 60° ; Boston, 10° , 59° . *Rhode Island*—Newport, 14° , 56° . *Connecticut*—Mystic, 0° , 53° ; New London, 12° , 57° . *New York*—Brookhaven, -5° , 58° ; Plattsburg Barracks, -1° , 45° ; New York City, 12° , 58° ; Rochester, 8° , 52° ; Buffalo, 6° , 49° ; Wappinger's Falls, 12° , 60° . *New Jersey*—Somerville, 7° , 59° ; Atco, 13° , 64° . *Pennsylvania*—Tarentum, -12° , 46° ; Hulmeville, 9° , 64° ; Philadelphia, 13° , 62° ; Pittsburgh, 4° , 52° . *Delaware*—Dover, 12° , 60° ; Wilmington, 13° , 67° . *Maryland*—Cumberland, 4° , 48° ; New Market, 7° , 60° ; Baltimore, 15° , 61° . *District of Columbia*—Washington, 13° , 60° . *Virginia*—Wytheville, 5° , 52° ; Capeville, 26° , 64° ; Lynchburg, 17° , 52° . *West Virginia*—Helvetia, -2° , 52° ; Morgantown, 7° , 54° . *North Carolina*—Franklin, 0° , 56° ; Weldon, 21° , 70° . *South Carolina*—Aiken, 17° , 67° ; Charleston, 25° , 67° . *Georgia*—Gainesville, 13° , 68° ; Savannah, 24° , 73° ; St. Mary's, 23° , 74° . *Florida*—Mayport, 26° , 75° ; Key West, 55° , 79° ; St. Marks, 25° , 71° . *Alabama*—Green Springs, 17° , 68° ; Montgomery, 22° , 70° . *Mississippi*—Vicksburg, 20° , 72° . *Louisiana*—New Orleans, 27° , 70° ; Point Pleasant, 23° , 73° . *Texas*—Fredericksburg, 9° , 81° ; Jacksboro', 10° , 72° ; Corsicana, 18° , 73° ; Galveston, 29° , 71° . *Ohio*—Bellefontaine, -13° , 44° ; Columbus, -7° , 48° ; Cincinnati, -1° , 52° . *Kentucky*—Danville, -3° , 50° ; Louisville, 4° , 53° ; Bowling Green, -2° , 57° . *Tennessee*—Austin, -2° , 50° ; Memphis, 11° , 63° ; Knoxville, 6° , 57° . *Arkansas*—Judsonia, 9° , 71° . *Michigan*—Detroit, -4° , 42° ; Alpena, 9° , 38° ; Grand Haven, 12° , 42° ; Marquette, 2° , 40° . *Indiana*—Spiceland, -14° , 39° ; Indianapolis, -12° , 48° ; St. Meinrad, 10° , 56° . *Illinois*—Elmira, -23° , 44° ; Anna, -4° , 60° ; Chicago, -9° , 46° ; Cairo, 4° , 60° . *Missouri*—Ashley, -17° , 55° ; Corning, -13° , 62° ; St. Louis, -3° , 56° . *Kansas*—Fort Hays, -13° , 68° ; Independence, -4° , 60° ; Dodge City, -3° , 65° . *Wisconsin*—Neillsville, -18° , 41° ; Milwaukee, -8° , 44° ; Madison, -8° , 39° . *Iowa*—Byron, -17° , 46° ; Des Moines, -10° , 52° ; Keokuk, -13° , 52° ; Ames, -15° , 35° . *Nebraska*—Plattsmouth, -11° , 56° ; Omaha, -8° , 59° ; Ft. McPherson, -20° , 70° . *Indian Territory*—Fort Gibson, 3° , 63° ; Ft. Sill, 10° , 67° . *Minnesota*—Ft. Snelling, -12° , 38° ; Duluth, -14° , 38° ; Breckenridge, -17° , 40° . *Dakota*—Morrison, -12° , 45° ; Bismarck, -20° , 48° ; Pembina, -22° , 41° ; Yankton, -11° , 55° ; Deadwood, -25° , 54° . *Colorado*—Colorado Springs, -15° , 59° ; Denver, -12° , 62° ; Ft. Garland, -23° , 51° . *Wyoming Territory*—Cheyenne, -12° , 56° ; Ft. Fred. Steele, -28° , 54° . *Utah*—Salt Lake City, 8° , 56° . *Nevada*—Winnemucca, -6° , 65° . *California*—San Francisco, 40° , 68° ; Sacramento, 23° , 66° ; Red Bluff, 25° , 71° ; Campo, 7° , 80° . *New Mexico*—Santa Fe, 0° , 65° ; Ft. Union, -11° , 61° . *Idaho*—Boise City, 7° , 53° . *Montana*—Virginia City, -15° , 46° .

Ranges of Temperatures.—The *monthly ranges* will appear from an examination of the minima and maxima just given. Greatest *daily ranges* vary in New England from 18° at Wood's Holl to 33° at Burlington; Middle Atlantic States, 19° at Lynchburg to 29° at Cape Henry; South Atlantic States, 23° at Savannah and Charleston to 30° at Jacksonville; Gulf States, 14° at Key West to 33° at Montgomery and 35° at Corsicana; Ohio valley and Tennessee, 20° at Louisville to 29° at Nashville; Lake Region, 15° at Grand Haven and Buffalo to 29° at Milwaukee; the Northwest 20° at Dubuque and Davenport to 43° at North Platte; Rocky Mountains, 39° at Colorado Springs to 47° at Santa Fe; Western Plateau, 24° at Salt Lake to 43° at Winnemucca; California, 16° at San Francisco to 23° at Visalia and 54° at Campo.

Frost has been quite general over the northern sections of the country and interior of the Southern States; at stations along the Gulf and South Atlantic coasts frosts have occurred from five to fifteen days.

Ice formed in the Gulf and South Atlantic States and on the Pacific coast as follows:—Denison, Tex., 14th; Laredo, Tex., (16th first,) 25th, 26th, 27th; Montgomery, 19th, 28th; St. Marks, 19th, 28th; Atlanta, Ga., 20th, 26th; Tybee Island, Ga., (23rd, 1 inch, first,) 28th, $1\frac{1}{2}$ in.; Savannah, 23rd, $\frac{1}{2}$ in., 24th, 27th, 28th, 29th; Princeton, Cal., 14th, (16th to 25th, $\frac{1}{2}$ in.,) 26th, $\frac{1}{2}$ in., 27th, $\frac{1}{2}$ in., 29th, $\frac{1}{2}$ in.; Green Springs, Ala., 16th to 18th; Mayport, Fla., 6th, $\frac{1}{2}$ in.; Okahumpka, Fla., 28th, $\frac{3}{8}$ in.; Melissa, Tex., 10th, $\frac{1}{2}$ in., 23rd, 1 in., 24th, creeks frozen over, 31st, 3 in.; Sacramento, Cal., 8th, 14th to 20th, 22nd, 26th, (27th, $2\frac{1}{2}$ in.,) 29th, $3\frac{1}{2}$ in.; Eagle Pass, Tex., 15th, 16th, 18th, 21st, 25th, 26th; Point Pleasant, La., 16th to 18th, 22nd to 28th; Brookhaven, Miss., 3rd, 4th, 5th, 15th to 18th, 22nd, 23rd, 26th to 28th; Los Angeles, Cal., 12th, 13th, 14th, 18th, 25th; Visalia, Cal., 27th $\frac{1}{2}$ in.

Ground Frozen.—The following items will serve to show the occurrence of frost in ground in the same districts: Denison, Tex., 16th; Savannah, 28th, 29th; Green Springs, Ala., 16th to 18th, 22d to 25th, 27th, 28th; Thomasville, Ga., 28th; Melissa, Tex., 15th; Brookhaven, Miss., 15th to 18th, (24th, two in.)

PRECIPITATION.

On chart No. III is illustrated the general distribution of the precipitation for the month. On the left side is a table giving the average precipitation for December, which shows a decided excess in the northeast districts and the East Gulf States, and a large deficiency on the Pacific coast.

Special Heavy Rains.—1st, Clarksville, Tenn., 2.50 in.; Pt. Pleasant, La., 3.01 in. 2nd and 3rd, Dunbarton, N. H., 3.08 in. 8th and 9th, Clarksville, Tenn., 3.00 in.; Pt. Pleasant, La., 7.02 in. 9th, Tybee Island, Ga., 3.41 in. 9th and 10th, White Plains, N. Y., 4.10 in.; Fayetteville, N. C., 6.00 in.; Tioga, Pa., 3.75 in.; Fallston, Md., 4.05 in.; Newark, N. J., 3.99 in.; Auburn, N. H., 4.00 in.; Contoocookville, N. H., 3.00 in. 10th, Mystic, Conn., 2.40 in.; Gardiner, Me., 3.84 in.; Rowe, Mass., 3.00 in.; Ardenia, N. Y., 4.51 in.; Weldon, N. C., 2.44 in.; Tarentum, Pa., 3.00 in.; Cape Henry, Va., 3.07 in. 10th and 11th, Mechanics' Falls, Me., 4.73 in.; Dunbarton, N. H., 4.28 in.; Cape Lookout, 3.66 in.; Oswego, 3.69 in.; 11th, Atco, N. J., 2.52 in.; Boyd's Corners, N. Y., 5.02 in.; North Volney, N. Y., 3.75 in. 19th and 20th, Galveston, 4.79 in.; New Orleans, 2.77 in.; 19th to 21st, Pt. Pleasant, La., 4.81 in. 20th and 21st, Thomasville, Ga., 3.38 in.; Fayetteville, N. C., 6.00 in.; St. Marks, 3.78 in. 21st, Cape Lookout, 4.77 in.; White Plains, N. Y., 2.40 in.; Sandy Hook, 2.72 in. 24th, Pt. Pleasant, La., 2.81 in. 30th, Pt. Pleasant, La., 3.01 in. 31st, Los Angeles, Cal., 3.58 in.

Largest Monthly Rain-falls.—Mt. Pleasant, La., 17.69 inches; Fayetteville, N. C., 14.50 in.; Cape Lookout, 11.25 in.; Dunbarton, N. H., 10.63 in.; Oswego, 10.49 in.; Cape Hatteras, 10.20 in.; Mechanics Falls, Me., 9.64 in.; White Plains, N. Y., 9.40 in.; Clarksville, Tenn., 9.25 in.; Galveston, 9.07 in.; Saugeen, 8.86 in.; Mt. Washington, 8.77 in.; Boyds Corner, N. Y., 8.74 in.; Buffalo, 8.55 in.; Ashland, N. H., 8.25 in.; North Volney, N. Y. 8.35 in.; Palermo, N. Y., 8.12 in.; Cape Henry, 8.06 in.

Smallest Monthly Rain-falls.—Deep Creek, Utah, and Fort McKavett, Tex., none; Fort Concho, Tex., and Camp McDermitt, Nev., trace; Winnemucca, Nev., 0.02 inches; Fort Lyon, Col., 0.10 in.; Salt Lake City, 0.11 in.; Fort Davis, Tex., 0.12 in.; Princeton, Cal., 0.13 in.; Yuma, Ariz., 0.14 in.; Castroville, Tex., 0.17 in.; Dodge City, Kan., and Cheyenne, Wy., 0.19 in.; Visalia, Cal., and North Platte, Neb., 0.20 in.; Brackettsville, Tex., and De Soto, Neb., 0.24 in.; Omaha, 0.27 in.; Logan, Ia., and Clear Creek, Neb., 0.30 in.; Stockton, Tex., and Burkes, Ariz., 0.31 in.; Sacramento, Cal., 0.47 in.

Floods.—Tioga, Pa., 9th, river overflowed, doing considerable damage to roads and bridges. Catawissa, Pa., 12th, river 22½ ft. above low water. Lockhaven, Pa., 11th, Bald Eagle creek overflowed, flooding low part of town. 10th, at Kingston, N. Y., storm most severe in this part of State since 1802. Country flooded; at Eddyville much damage to canal boats and property. Paterson, N. J., at midnight of Tuesday "the flood reached within a few inches of that of 1854, the greatest since 1810, and still rising." Dec. 11, a. m., higher than ever known before; streets inundated from 4 to 5 feet deep; factories, bridges and dams much damaged. Delaware River—at Bordentown, all railroads under water; Trenton, N. J., higher than before known. Susquehanna river—severe floods for fifty miles; Lehigh valley R. R. flooded for miles—1 mile swept away. Albany, N. Y., 11th and 12th, Hudson river overflowed its banks, flooding lower part of city; Mechanics' Falls, 9th to 11th, severe freshets, bridges &c. carried away; 40 feet of railroad track washed away south of Garrison's; tide higher than for years. Springfield, Mass., 11th, Connecticut river rose to 18 ft. 6 in. above low water mark, or highest water since 1854; at Hartford it rose 24 ft. above low water mark, submerging city front. Contoocookville, N. H., 12th, river very high, mills stopped, railroads badly washed, &c. The Merrimac, at Concord, N. H., within one inch of highest water (1869) ever known; railroad tracks submerged and badly washed. West Deerfield, Mass., 50 ft. washout on Troy & Greenfield R. R. Brattleboro, Vt., heavy flood in low part of village. Northampton, Mass., fifty houses flooded; Mill river higher than ever known before. Rapid rises were reported in Cape Fear river, at Fayetteville, on the 9th, 42 feet; on the 21st, 45 feet; and 28th, 42 feet.

Hail.—Fort Sill, Ind. T'y, 30th; Camp McDermitt, Nev., 6th; Mt. Sterling, Ill., 8th; Creswell, Kan., 13th; Owing's Mills, Md., 21st; New Bedford, Mass., 2d; Linden, N. J., 14th; Somerville, N. J., 4th; White Plains, N. Y., 14th; Flushing, N. Y., 10th; Weldon, N. C., 4th, 20th, 26th; College Hill, Ohio, 4th; North Lewisburg, Ohio, 8th; Pittsburg, Pa., 15th; Ringtown, Pa., 4th; Accotink, Va., 2d; Red Bluff, Cal., 9th; Cheyenne, Wy. T'y, 3d; Smithville, N. C., 26th; Fort Whipple, Va., 26th; Atlantic City, N. J., 4th.

Rainy Days.—The number of days on which rain or snow has fallen, varies as follows: New England, 10 to 18; Middle States, 8 to 17; South Atlantic States, 8 to 14; Gulf States, 6 to 17; Ohio valley and Tennessee, 11 to 26; Lower Lake region, 20 to 28; Upper Lake region, 8 to 23; Upper Mississippi valley, 6 to 21; Lower Missouri valley, 4 to 14; Eastern slope, 3 to 14; Rocky Mountains, 6 to 10; Western Plateau, 2 to 4; Pacific coast, 1 to 15.

Cloudy Days.—For New England the number varies from 7 to 24; Middle States, 6 to 19; South Atlantic States, 9 to 15; Gulf States, 5 to 14; Ohio valley and Tennessee, 12 to 23; Lower Lake region, 18 to 31; Upper Lake region, 12 to 29; Upper Mississippi valley, 11 to 22; Lower Missouri valley, 8 to 17; Eastern Slope, 8 to 14; Rocky Mountains, 2 to 9; Western Plateau, 3 to 9; Pacific Coast, 3 to 6.

Snow.—West of the Appalachian range the precipitation occurred generally in snow. On the Pacific, Gulf and South Atlantic coast, it occurred as follows: In *British Columbia*, on the 3d, 17th and 18th. *Oregon*—on the coast mountains, 9th. *California*—on the coast mountains, 25th and 29th. *Texas*—interior, 13th, 16th, 17th, 20th, 21st, 25th, 26th, 28th. *Louisiana*, 26th. *Alabama*—interior, 10th, 26th, 27th. *Georgia*—interior, 9th, 10th. *North Carolina*, 4th, 5th, 6th, 17th, 18th, 20th, 21st, 26th and 27th.

Depth of Snow on Ground at end of Month.—At the end of the month the country north of a line almost identical with the isotherm of 35°, given on chart No. II, remained covered with snow. It varied in depth in the different sections as follows: In *New England*, from none or a trace along the coast to 9 inches in Vermont and 24 inches in the White Mountains. *Middle States*, trace to 1 inch along coast to 4 inches in

interior. *Western North Carolina and northern Georgia*, $\frac{1}{2}$ inch. *Tennessee*, none to 2 inches. *Ohio valley*, 2 to 24 inches. *Lower Lakes*, 4 inches to 2 or 3 feet at eastern ends of Lakes Erie and Ontario. *Upper Lakes*, 1 to 2 inches near Lake Superior to 2 or 3 $\frac{1}{2}$ feet along eastern shore of Lake Michigan. *Northwest*, generally from 1 to 6 inches, except from Arkansas to Illinois, where it was much deeper, some observers reporting 2 and 3 feet. *Rocky Mountain stations*, 1 $\frac{1}{2}$ inch at Santa Fé to 7 $\frac{1}{2}$ at Denver and 4 at Virginia City. *Black Hills*, Deadwood, 18 inches.

RELATIVE HUMIDITY.

The average percentage of relative humidity for the month ranges as follows: New England, 65 to 79; Middle Atlantic States, 62 to 78; South Atlantic States, 65 to 72; East Gulf States, 72 to 79; West Gulf States, 61 to 81; Lower Lakes, 71 to 84; Upper Lakes, 66 to 83; Ohio valley and Tennessee, 65 to 76; Upper Mississippi valley, 70 to 76; Lower Missouri valley, 70 to 85; Red River of the North valley, 84 to 94; Eastern Slope, 61 to 77; Western Plateau, 46 to 59; California, 44 to 59. *High stations* report the following; not corrected for altitude: Cheyenne, 66; Denver, 51; Colorado Springs, 63; Santa Fe, 49.

WINDS.

The prevailing winds at the Signal Corps stations are shown by arrows on chart No. II. From an examination of which, it will be seen that they have been almost, without exception, from the north or northwest, except in the Lake region, Ohio valley and Atlantic States, where they have been more westerly, and in some instances southwest.

Total Movements of the Air.—The following are the *largest* monthly movements recorded at the Signal Corps Stations, viz: Cape May, 16,567 miles; Wood's Holl, 15,969; Sandy Hook, 15,426; Cape Lookout, 14,227; Thatcher's Island, 13,584; Indianola, 12,428; Barnegat, 11,046; Cape Henry, 10,564; Sandusky, 10,426; Newport, 10,396; Key West, 9,917; Milwaukee, 9,858. The *smallest* are: Visalia, Cal., 1,443 miles; Deadwood, Dak., 1,658; Nashville, 2,853; Salt Lake City, 2,895; Santa Fe, 2,941; Lynchburg, 2,969; Indianapolis, 3,246; Augusta, 3,526; Knoxville, 3,730; Dubuque, 3,565; Eagle Pass, Tex., 3,620; Los Angeles, 3,906.

VERIFICATIONS.

Indications.—The detailed comparison of the tri-daily weather Indications with the telegraphic reports for the succeeding twenty-four hours, show the general percentage of omissions to be 1.4 per cent., and of verifications to be 87.1 per cent. The percentage of verifications for the four elements have been: weather, 93.6; wind, 84.4; temperature, 86.5; barometer, 83.8. The percentage of verifications by geographical districts have been: New England, 88.6; Middle States, 87.0; South Atlantic States, 85.5; East Gulf States, 90.1; West Gulf States, 88.6; Lower Lake Region, 87.1; Upper Lake Region, 88.4; Tennessee and the Ohio Valley, 85.5; Upper Mississippi Valley, 85.2; Lower Missouri Valley, 84.6. Of the 3,667 predictions that have been made, 118 or 3.2 per cent. are considered to have entirely failed; 141 or 3.8 per cent. were one-fourth verified; 361 or 9.8 per cent. were one-half verified; 281 or 7.7 per cent. were three-fourths verified; 2,766 or 75.5 per cent. were fully verified, so far as can be judged from the tri-daily weather maps.

Cautionary Signals.—During the month 187 Cautionary Signals were displayed; 155 or 82.9 per cent. were justified by subsequent hourly velocities of 25 miles or over at, or within 100 miles of, the station.

Cautionary Off-shore Signals.—50 signals, not included in the above, were ordered up as Cautionary Off-shore Signals; 36, or 72.0 per cent., of these were justified, both as to velocity and direction. 78 Cautionary Signals were changed to Cautionary Off-shore Signals, and, as to direction, 67 or 85.9 per cent. were justified; as to velocity they are considered with the cautionary. 68 cases were reported, generally from scattered stations, of winds of 25 miles or over where signals were not ordered.

NAVIGATION.

In the table, on right side of chart No. III, are given the highest and lowest readings, on the Signal Corps river-gauges, during the month, with dates of same.

Ice on Rivers and Lakes.—*Missouri*—Fort Randall, Dak., 24th, river closed by ice; Yankton, 13th, closed by ice; Omaha, 18th, closed by ice; Croning, 18th, closed by ice; Leavenworth, 11th to 14th, much floating ice,—17th, gorge formed one mile below,—18th, frozen over; Lexington, 23rd, closed; Booneville, 27th, closed. *Mississippi*—St. Paul, 14th, frozen over; La Crosse, 7th, first floating ice,—11th, ice gorged,—12th, river closed; Dubuque, 2nd, last boat of season left, latest closing of navigation since 1857,—7th, full of floating ice,—17th ice-gorge,—18th, frozen over,—23rd, teams crossing; Fulton, 9th, ice stopped running; Le Claire, 14th, frozen over, people crossing; Davenport, 7th, first floating ice,—14th shore ice,—18th, navigation closed,—20th, frozen over,—26th, teams crossing; Muscatine, 8th, floating ice, 19th, closed,—23rd, teams crossing; Burlington, 9th, first ice in river,—10th to 13th, floating,—13th, navigation entirely suspended,—16th, frozen over; Ft. Madison, 18th, river closed; Keokuk, 7th, much floating and shore ice,—10th, canal closed,—20th, ice 8 to 10 inches thick,—27th to 31st, floating and shore ice; St. Louis, 15th to 23rd, floating ice,—17th, navigation suspended,—24th, gorged and frozen over, people crossing; Cairo, 23rd to 31st, river frozen. *Maquoketa*—Monticello,